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Picking Winners in R&D Fads

Grant Swinger's Formula for Funding Success

Following is another in SGR's series of occasional interviews with Dr. Grant Swinger, Director of the Center for the Absorption of Federal Funds.

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SGR. How is the Center managing through the ups and downs of federal funding?

SWINGER. We're tuned to the fact that the half life of a research fad in Washington is never more than a few years, as can be seen from the topics that went critical one day and were gone the next: Ecology, energy, cancer, weather modification, poverty, arms control, economic development, and so on. And then there are the "revolutions," like materials and biological, that come and go. And the "explosions," like population and information. And the "gaps"—math, manpower, missiles, computer literacy. Not to mention assorted "windows" of opportunity and vulnerability. Many of these subjects could be epitaphs for large segments of the research establishment. But not for our Center.

SGR. Did you avoid these subjects?

SWINGER. Of course not. That's where all the action was and if you didn't get a piece of it, you had nothing. But rather than plunge in recklessly, we tended toward prudent involvement focused on the peculiar nature of the federal research agency. You see, federal agencies never move without surveys, literature searches, conferences and workshops, which lead to published proceedings, and followup conferences and workshops.

SGR. To get a program going?

SWINGER. Sometimes, but what usually happens is that by the time a report gets done, the agency people who ordered it have retired, been fired, or moved on to some other job, and their successors didn't even know the report was in the works. I tell you, there can be confusion in a government office when a messenger brings in a multi-volume report of hundreds, sometimes thousands, of pages 4 years after it was ordered by a staff that isn't there any more. There it is, offering options for reorganizing the agency or for starting a program that no one would even now consider, or for stopping one that got eliminated anyway last year. The Reagan people are still taking delivery on reports and studies that were ordered by the Carter people. In one case, the agency that ordered it had been abolished and its building had been torn down when the report was finally ready.

SGR. I see. What's hot today?

SWINGER. Industrial innovation studies. A genuine growth sector, as measured by the Swinger Index, which consists of numbers of papers produced, miles traveled, and conferences attended. I tell you, the circuit is humming and the Center is hardpressed to keep up with demand. Responses to calls for papers have been awesome.

SGR. What are you recommending for promoting industrial innovation?

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Move to Soviet Ties Brings Protests At National Academy of Sciences—Page 3

In Brief

The "6-month" study to produce recommendations for cutting red tape in federal-university relations remains enmeshed in the White Science Office a year after it was first announced (SGR Vol. XIV, No. 9). Co-Chaired by D. Allan Bromley, of Yale, and David Packard, of Hewlett-Packard, the study has been touted by President Science Adviser George A. Keyworth II as a Magna Carta for the grant economy. Staffers say that after 4 rewrites, it's still being reworked.

Also missing in the paperwork mill is the draft statement of DoD policy on classification of university-based research. Drawn up last year while Richard DeLauer was still chief of Defense R&D, the statement was to the liking of university representatives. Nothing more has been heard of it since it was sent to the National Security Council for review about 4 months ago.

But for the grand prix of slow motion, there's no match for the National Academy of Sciences. Five years and 3 Directors ago, NSF asked the Academy to study (in NAS's words) "the state and future of engineering education and practice in the United States." Phase I took 2 years. Last week, the NAS delivered the first installment of the final product—a 138-page report, "Engineering Education and Practice in the United States," that adds almost nothing to the numerous studies of the subject conducted by others over the past 5 years. Just shows that $900,000 doesn't buy much of a study these days.

. . . The Tragic Case of Computer Literacy

(Continued from page 1)

SWINGER. Let's not rush ahead. Our emphasis tends to be on the need for further study. Industrial innovation happens to be one of the rare subjects that doesn't just come and go, but keeps coming back, though pieces of the subject do drop off and disappear. An example is quality circles in Japanese factories. Remember quality circles? We ran up thousands of hours of conferencing on quality circles, and then the subject disappeared, apparently for keeps. It's sort of like the national debt or the missile gap. Big one day, gone the next. But despite that, industrial innovation seems durable. Nixon's people ordered up some very nice studies on the subject, and it got a lot of attention from Carter, too. As might be expected, nothing was done, but that's the nature of the game, and now it's back.

Shuns Programmatic Mode

SGR. Do you vary your approach to the problem as it returns over the years?

SWINGER. Yes and no. We naturally try to make use of our archival material. We have quite an accumulation of papers, analyses, and hypotheses and no end of case studies from previous outbreaks of interest in this subject. But, basically, our position today is the same as it was 15 or 20 years ago. We continue to insist that it would be premature to rush into a programmatic mode at this stage. Instead, we recommend issuance of a call for papers, a conference, and commissioning of more case studies.

SGR. Studies of what?

SWINGER. That's not as formidable a problem as some think. It's true that we've pretty well worked over the railroads, penicillin, hybrid corn, the Boeing 707, frozen orange juice, and the copying machine. But there's no reason we can't go back again. One possibility, of course, is comparative studies. Study them in isolation and then compare them. That's the function of our Division of Comparative Studies. But the ultimate aim is to convene a conference.

SGR. For what?

SWINGER. A properly structured conference will almost inevitably have unforeseen outcomes. We supply speakers and discussants, and attend to the usual organizational matters—panels, subpanels, workshops. And, of course, we prepare the proceedings. But it must be understood that we think more in terms of process rather than product, though we are not oblivious of product. However, we have to be careful, because we're getting to that perilous point where overexposure can prematurely wipe out a field in an instant. We're already seeing it with some topics that were hot until very recently.

SGR. For example?

SWINGER. There's the really tragic case of computer literacy. We had big hopes for that one, because it was one of those rare subjects where all walks of society could be made to feel anxious. I mean, you couldn't get away with telling people that they're obsolete if they don't understand the inner workings of their automatic transmissions or their TV sets. They'd say, so what if I don't understand, as long as it works. But we were making a lot of progress on computers, until we overplayed the anxiety bit. It got to be so transparent that even the President of Harvard saw through it. In other fields, we could repair the damage by warning that the Russians are ahead, but no chance of that with computers.

SGR. What can you do?

SWINGER. We're brainstorming it, but in the meantime, we see many growth sectors here or on the horizon.

The "Excellence" Market

SGR. Like what?

SWINGER. Excellence.

SGR. In what?

SWINGER. In anything. Excellence is big these days. Everyone is for it. Conferences on excellence draw big crowds.

SGR. What else?

SWINGER. Health-policy studies remain a growth area. I thought that by now the market would be gone

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Protests Grow as NAS Pursues Soviet Accord

The managers of the National Academy of Sciences (NAS) are proceeding toward a resumption of scientific exchanges with their Soviet counterpart, but they're encountering increasing opposition both in and out of the NAS.

As is usually the case when elephantine institutions agree to work out an agreement, progress in the inter-academy *rapprochment* has been slow. In recent weeks, the NAS sent its Soviet counterpart a draft of detailed proposals for the resumption of scientific exchanges that the two organizations agreed to in a general protocol signed in January (SGR Vol. XV, No. 2) in Moscow. NAS President Frank Press headed the American delegation.

It's still too soon for a reply to be considered overdue, NAS sources say. But it's already plain that the NAS was being optimistic when it announced in January that "Our discussion with the Soviet Academy will continue over the next 3 months as details of the final agreement are completed."

NAS officials have tended to be non-communicative about their dealings with the Soviets, insisting that the relationship is a private matter and that public discussion at this point might possibly upset the deal. They never revealed the contents of the January protocol, and they're equally secretive about the proposed draft.

But in and around the Academy, there's an aroma of difficulty on the subject of renewed ties. These were severed in response to Soviet human rights offenses and, in particular, the maltreatment of Andrei Sakharov. Though recent Soviet behavior in such matters is possibly at a post-Stalin low, the NAS received no sign of a change in return for its responsiveness to repeated Soviet suggestions for a renewal of relations. Following the January visit to Moscow, it was reported that Sakharov, who has apparently recovered from a long fast, has threatened to resign from the Soviet Academy in protest against his continued banishment to Gorky and limited opportunities for continuing his research.

The NAS draft went out "several weeks ago," according to an Academy source, who said that the next step is up to the Soviets. They're reported to have been silent on the exchange issue since the January signing, but at this stage of the negotiating process, the absence of word from the Soviets is said to be not unusual.

Meanwhile, the pending resumption of inter-academy relations has evoked a protest from 3 Nobel laureate NAS members, Christian B. Anfinsen, Johns Hopkins University; Paul J. Flory, Stanford, and Arno Z. Penzias, Bell Laboratories. There's also been a separate and strong expression of disapproval from the Reagan Administration's preeminent hardliner, Assistant Secretary of Defense Richard Perle.

The 3 Nobelists chose the columns of *Science* (May 3) to state their dissent, which focused on the morality of renewed dealings with the Soviets in the absence of any changes in the behavior that inspired the cutoff. "What, then, has changed in the past 5 years to explain the about-face from the moral stance of 1980?" the 3 asked. "Have human rights for scientists in the USSR shown improvement? Sakharov is representative of scores of others; his situation has worsened—neither he nor his wife can get the medical attention they request, and she too has been banished to Gorky.

"Scientific seminars by jobless refusenik scientists are

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Swinger

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for studying whether people go to the doctor more often when it's free or when it costs them their own money. But there's still gold in that subject, even though the answer always comes out just as you expect it would.

SGR. What else?

SWINGER. There's a certain amount of seasonal business, such as drafting commencement addresses. Our current inventory of titles includes: "The University: Change and Continuity," "Science and Democracy," and "New Horizons in Engineering Education." And then we have 2 utility titles that can cover almost any situation: "Toward a New National Agenda," and "Perspectives on the Postwar Experience."

SGR. What about Star Wars?

SWINGER. We've put out an advisory that's very simple: Get it while you can, because it has all the markings of a long-term commitment that suddenly folds up.

SGR. Are there any newly emerged fields of research that you're especially excited about?

SWINGER. There are always promising newcomers. Two years ago, you never heard of Alzheimer's. Today it's golden. Pornography remains strong. Arthritis has run down a bit, but could be staging a comeback. Child and spouse abuse are big on the conference circuit. And there's always genetic engineering, biological revolution, and all that. Like we've always said, "As long as you're up, get me a grant."

SGR. Thank you, Dr. Swinger. —DSG

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(Previously published interviews with and writings by Dr. Swinger have been collected in "The Grant Swinger Papers," 32 pages, $4.95 domestic postpaid [add $1.50 for overseas airmail], available from SGR, PO Box 6226, Washington, DC 20015.)

. . . DOD Perle's Chastises NAS on Negotiations

(Continued from page 3)

in danger of elimination. The NAS Human Rights Committee, in a recent report, sounds angry: 'none of our numerous letters and telegrams to the Soviet authorities have been answered. Many new arrests of scientists have come to the attention of the Committee . . . .' If anything has changed it has been for the worse."

In an apparent rebuff to President Press's argument that nuclear dangers necessitate an expansion of communication with the Soviets, the protesting NAS members noted in their letter that despite the disruption of scientific ties, representatives of the 2 academies have periodically met to discuss arms-control and related issues. (The next meeting is on schedule for June.)

"Why, then," they continued, "the haste in getting back to doing business as usual?" And they sharply added, "To have held the negotiating meeting in Moscow makes it hard to avoid an unfortunate hat-in-hand image."

In a brief conversation following testimony in the House on other matters, Press told SGR that despite the strongly worded letter from the 3 academicians, he feels confident that the NAS membership favors the renewal of exchanges. The annual April meeting, he said, drew a record of over 500 of the NAS' 1450 members. Those in attendance, Press said, expressed their support in various ways. However, the issue of NAS-Soviet ties was not put to a vote.

Assistant Secretary Perle's comments on the NAS negotiations with the Soviets were made May 3 during a discussion at the National Press Club on "National Security and Scientific Inquiry," sponsored by the Scientists' Institute for Public Information, the AAAS, and the Association of American Universities.

After asserting that Soviet scientists visiting the US usually are either full-fledged intelligence agents or legitimate scientists on intelligence assignments, Perle was asked to comment on the Academy's move toward resuming ties with the Soviets.

Thrown that fat pitch, Perle responded that perhaps some visiting Soviet scientists are not involved in intelligence work, but it's difficult to distinguish them from the others, he said. He then expressed regrets that he couldn't share intelligence reports with his audience, mostly reporters, but added that some visiting Soviet scientists were involved with "some very menacing defense technologies."

Perle scoffed at the notion that "nothing of military consequence" reaches Soviet researchers who obtain access to unclassified American university laboratories. "I doubt that," he said, adding, "If it were up to me, I would discourage scientific exchanges with the Soviet Union."

Perle concluded, "I must say, I am disappointed at the National Academy, which for some time had taken the position that the willingness of the American scientific community to enter into exchanges had something to do with the treatment of Andrei Sakharov. As far as I know, that treatment has not significantly improved."

Industry, Business Lead Growth in Hiring of PhDs

Industry and business came up fast from 1973-83 as employers of PhD scientists and engineers, but academe, though slipping, still provided the biggest job market, according to the latest job survey of the National Science Foundation. There's little reason to doubt that these trends have continued.

During the decade to 1983, the industry and business sectors increased their share from 24 to 31 percent of the nation's PhD scientists and engineers, while the academic share declined from 59 to 53 percent, according to NSF. In terms of growth rates over the 1981-83 period, industry and business increased heir employment of PhDs at an annual rate of 7 percent; academic employment went up by 2.4 percent; the federal government, which is the third largest employer of scientists and engineers, increased its 1981-83 hiring by only 1.4 percent per year.

The survey, based on a sampling of about 13 percent of all PhD recipients between 1940 and 1982, found that increasing numbers of science and engineering PhDs have been moving into non-R&D work in industry, such as sales, production, and quality control. Over the 1973-83 decade, the percentage of the PhD work force in these activities rose from 9 to 18 percent. At the same time, the proportion reporting teaching as their primary occupation declined from 36 to 29 percent; management also declined, from 21 to 17 percent.

Among other findings of the NSF survey:

From 1981-83, employment of PhD computer specialists rose at an annual rate of nearly 16 percent, about 3 times the average rate of other fields. Life scientists and psychologists experienced a 4.5-percent increase, while the environmental and physical sciences rose at a rate of less than 2 percent.

(Science Resources Studies Highlights Report No. 85-301, 4 pages, no charge, available from NSF, Division of Science Resources Studies, 1800 G St. Nw., Washington, DC 20550.)

NIH Recombinant Advisory Role Gains Friends

Just a few years ago, the Recombinant DNA Advisory Committee (RAC) was earnestly seeking its own abolition. In recent months, however, RAC—based in the National Institutes of Health—has been stressing its indispensability to the federal bureaucracy, academic science, and the biotechnology industry. The change appears to have been created by several threats to RAC's unique and cherished role of kindly protector of basic research—a role it has filled through a policy of benign and ever-diminishing regulation.

The RAC membership, though recently expanded to include ecologists and ethicists, is still largely composed of molecular biologists who are themselves engaged in recombinant DNA research. At the most recent meeting, on May 3, David Martin, Vice President for Research of Genentech, led his fellow Committee members in protest against high-level recommendations for other federal agencies to clone NIH's RAC operation. He described that possibility as "the most signficant threat to recombinant DNA technology that has yet occurred."

Cast in the role of chief Philistine is the Environmental Protection Agency, which now seeks to extend its long-standing authority over commercial pesticides to cover certain recombinant DNA experiments. Normally, pesticides in the research phase are exempt from any EPA regulations if tested on plots under 10 acres. EPA is proposing to remove that exemption in cases of microbial pesticides produced by genetic engineering.

Under the proposed revision, researchers seeking an Experimental Use Permit would have to send EPA a lengthy description of their experimental plans; the agency would have 90 days to decide whether to require an even lengthier account. Though the proposed rules amount to little more than a notification requirement, and do not apply to laboratory or greenhouse research, they are nonetheless being taken as an ominous sign by university and industrial researchers. The reason, quite simply, is that the prevailing system under RAC is even easier.

More ominous, in the view of these researchers, is EPA's announced intention of regarding DNA as a "new chemical substance," which would make it subject to the mysteries of the Toxic Substances Control Act. It's not likely that the backlogged and hardpressed EPA would come down hard on substances in this category, but there's no way of knowing at this point.

Meanwhile, those who have found RAC's style of operations quite comfortable have encountered additional grounds for concern in an unexpected place. Under Director George A. Keyworth II, the White House Office of Science and Technology Policy (OSTP) has been a major champion of the commercial potential of genetic engineering and a harsh critic of regulatory impediments to research and marketing. But OSTP has added to the regulatory confusion by publishing a 52-page proposal for a "Coordinated Framework for Regulation of Biotechnology." It is not notable for lucidity.

Included in this document, which was published in the *Federal Register* of December 31, 1984, is an 18-page "matrix" listing all laws, regulations, and guidelines, and the products they apply to. The OSTP proposal calls for each federal agency involved in recombinant DNA research to create its own Recombinant DNA Advisory Committee—one each for the Department of Agriculture, EPA, the Food and Drug Administration, the National Science Foundation, plus the one already at NIH. OSTP also recommended creation of a Biotechnology Science Board to oversee the proposed flock of RACs. Its duties would include deciding which federal agency would handle which applications from researchers and industry.

In response to the "Framework" proposal, RAC has sent a formal comment to OSTP Deputy Director Bernadine H. Bulkley, who handles life science issues for the Office. RAC took the position that all laboratory research should remain within its purview. To get around the problem that set off the whole OSTP review—namely, that RAC's rules are binding only on federally supported recombinant research, and not on industrially funded work—RAC suggested that EPA and the others could simply require their applicants to follow RAC guidelines during the laboratory phase of commerical development.

EPA officials say that the approach raises legal problems. RAC coyly hints that it doubts that EPA would know how to apply RAC's methods. Among the regulatory-minded, there's also the fear that with 5 overlapping RACs in the business, savvy companies may target their proposals to the softer marks, creating a confusion of precedents at a time when regulation and law are far from settled in this area.

Regardless of what comes of the OSTP proposal, one inconsistency has already emerged and will have to be dealt with: As things now stand, private companies that want to field test recombinant organisms appear to have the choice of going to RAC or EPA. Thus, Monsanto has announced that it intends to go through EPA for its planned field tests of recombinant organisms, rather than take the RAC route that's been blocked for field tests of frost-free organisms designed by Steven Lindow, of UC Berkeley. Monsanto decided to go that way after Jeremy Rivkin, the anti-biotechnology campaigner, took off against the Lindow proposal and got a federal court order requiring that any environmental testing of recombinant organisms be accompanied by a formal environmental assessment document (SGR Vol. XV, No. 3). Applicants thus face the possibility that the combative and indefatigable Rivkin might take them to

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In Print: Superfund, Science "Outlook" & More

Superfund Strategy, report by the Congressional Office of Technology Assessment, says EPA has seriously underestimated extent of toxic waste problem; warns that 10,000 sites may require cleanup but that "With Superfund's existing resources, it is not technically or economically possible to permanently clean up even 2000 sites in less than several decades." OTA urges balancing of present concentration on most threatening problems with "early identification and assessment of potential problem sites," plus various other revisions in the current EPA strategy, which OTA says "could result in an environmental crisis years or decades from now."

(282 pages, $10, GPO Stock No. 052-003-00994-3, Superintendent of Documents, USGPO Washington, DC 20402. Note: OTA says that despite the title on the cover—as above—GPO lists this volume under the title of *Cleanup of Uncontrolled Hazardous Waste Sites Under Superfund.)*

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Current Science and Technology Policy Issues: Two Perspectives, papers delivered by Harvey Brooks, Harvard Professor of Technology and Public Policy, and Roland Schmitt, GE Senior Vice President, Corporate R&D, to the Science Policy Seminar Series of The George Washington University Graduate Program in Science, Technology, and Public Policy. As Chairman of the National Science Board, Schmitt wields some influence over NSF, and has been arguing for broader and steadier federal support of academic research, as he does in this paper, delivered last year. The Brooks paper, delivered in 1982 and revised last year, provides an admirably concise review of the postwar evolution of federal science policy.

(The papers, bound together, 71 pages, are available without charge from Science Policy Program, Gelman Library 714, GW University, Washington, DC 20052; tel. 202/676-7292.)

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The Impact of US and Soviet Ballistic Missile Defense Programs on the ABM Treaty, Star Wars analysis by 3 well-informed arms-control proponents: Thomas K. Longstreth (Associate Director, Arms Control Association), John E. Pike (Associate Director, Federation of American Scientists), and John B. Rhinelander (Washington lawyer who served as legal adviser to the SALT 1 delegation). They warn that anti-missile research programs of both countries are undermining the ABM treaty, and urge diplomatic efforts to reinforce the treaty and eliminate ambiguities.

(99 pages, $3, National Campaign to Save the ABM Treaty, 1346 Connecticut Ave. Nw., Suite 903, Washington, DC 20036; tel. 202/463-4213.)

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The 1982 Postcensal Survey of Scientists and Engineers, results of survey conducted for NSF by the Bureau of the Census, based on the 88,000 replies that came back from a sample of 122,000 scientists and engineers covered by the 1980 census; detailed tables provide data on employment, pay, level of education, race, sex, etc. in 52 fields of science and engineering.

(179 pages, no charge, Division of Science Resources Studies, Demographic Studies Group, NSF, 1800 G St. Nw., Washington, DC 20550; tel. 202/634-4664.)

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The Outlook for Science and Technology 1985, a status report on American science, plus a list of R&D-related issues for Congressional consideration, prepared by the National Academy of Sciences in a stand-in for the White House Science Office, which was given the task by statute in 1976, but considers it a waste of time. NAS has been grappling with this chore for 4 years of annual self-congratulations over a job well done, but it's hard to find anyone apart from the NAS producers who see the outcome as useful. The report rehashes "recent progress" in science and technology—onco-

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Tech Medal Nominations Open

Nominations are open until July 31 for the presidentially awarded National Medal of Technology, designed to honor individuals and companies for "improving the well-being of the United States through the promotion of technology or technological manpower." For nomination instructions: Philip Goodman, National Technology Medal Nomination Evaluation Committee, Room 4824, US Department of Commerce, Washington, DC 20230.

RAC

(Continued from page 5)

court on each proposal, claiming that the assessment is inadequate or that a full environmental impact statement is required. The process could take years.

The most likely outcome is that RAC will continue to oversee—and protect—laboratory research, but will cede to EPA the oversight of field testing. And EPA and other agencies that regulate commercial products may yet be convinced to leave laboratory work to NIH's RAC.

The reality of the matter is that even though RAC's authority is not binding on private companies, apparently no one has dared yet go ahead with laboratory experiments without RAC's blessings. The reason is that RAC's benign regulation is good for public relations and perhaps even better for liability protection.

. . . Star Wars, Science Policy, and the Archives

(Continued from page 6)

genes, computers, materials, etc.—and then outlines for Congress a number of well-worn subjects, among them science and secrecy, financing of academic laboratory equipment, and the problems of atmospheric nuclear explosions.

(50 pages, $3, National Academy Press, 2101 Constitution Ave. Nw., Washington, DC 20418.)

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Lost at the Frontier: US Science and Technology Policy Adrift, by Deborah Shapley and Rustum Roy, contends federal R&D policy has emphasized basic research to the detriment of applied science and industry; includes responses by various public figures associated with science policy, including William O. Baker, James R. Killian Jr., and Eric A. Walker.

(223 pages, softcover $13.95, hardcover $19.95, ISI Press, 3501 Market St., Philadelphia, Pa. 19104; tel. 215/386-0100.)

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The Strategic Defense Initiative: Costs, Contractors and Consequences, a critical report on the Administration's Star Wars program by the Council on Economic Priorities, which is of anti-Reagan orientation on spending choices; provides a detailed description of the program, lists scores of industrial contractors, their projects and funding, and recommends that "Congress should significantly slow the SDI's funding growth rate unless and until a more complete analysis indicates that the goal is technologically and economically feasible."

(Whatever the motives, the Senate is, in fact, aiming for big cuts in the $3.7 billion that the Administration is seeking for SDI for the next fiscal year.)

(215 pages, plus appendices, $12, Council on Economic Priorities, 30 Irving Pl., New York, NY 10003; tel. 212/420-1133.

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Report of the Committee on the Records of Government, sponsored by the American Council of Learned Societies, the Social Science Research Council, and the Council on Library Resources, concludes that federal, state, and local governments "store totally valueless records haphazardly and at high annual cost . . . . while failing to create or retain" records of both current and historical value; also warns acidification is destroying old records, while modernday electronic record keeping is endangering valuable materials, and recommends creation of a presidentially appointed Federal Records Management Policy Council, to be headed by the Archivist of the United States, to oversee federal recordkeeping and carry out other duties aimed at improved maintenance of historically important documents.

(191 pages, no charge, Council on Library Resources, 1785 Massachusetts Ave. Nw., Washington, DC 20036; 202/483-7474.

To the Editor

While I was pleased that *Science Digest* was not included in the tally ["Pop Science Magazines Reported in Trouble"—SGR Vol. XV, No. 5], I am afraid that we are probably being tarred with the same brush. You might be interested to know that in the course of 1 year, thanks to a turnaround in all of our important indices, including subscription renewals and "blow-in card" response, *Science Digest* is at the break-even level.

According to *Media Industry Newsletter,* we were the only [non-professional] science magazine to be up in advertising pages for the first 4 months of this year. I would like to point out that we won the Arbor Foundation Award for our "Acid Rain" cover story against competition that included *Time, Newsweek, The New York Times Sunday Magazine,* and *Atlantic.*

Oliver Moore III
Editor
Science Digest

In Quotes: Commerce Dept. Neglecting Industry

The following is from testimony by Lewis M. Branscomb, IBM Vice President and Chief Scientist and former Chairman of the National Science Board, May 2 at a hearing on "The Effect of New Technologies on Economic Competitiveness," before the Subcommittee on Science, Technology, and Space of the Senate Committee on Commerce, Science, and Transportation.

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Because the NSF must place its first priority on the support of the most fundamental science, it is unreasonable to expect that the needs of the economy can be fully reflected in federal R&D priorities through the NSF engineering program alone. When one looks at the total federal involvement in research, it is clear that the priorities are, in order: defense, space, energy, health, and fundamental science. These programs all contribute something to the technology base for a competitive civil economy, but they also compete for scarce technical talent and bid up its cost. We need a national science policy that places a balanced emphasis on the needs of the civil economy for a strong scientific base . . . . NSF is responsible for 27 percent of the Federal support for basic research in our universities. It cannot give prime weight to research areas of strategic commercial interest . . . .

The economy is poorly represented in the funding distributions for different fields of research because the Department of Commerce has failed, over many years, to accept responsibility for representing the interests of industry in the science-priority debate . . . . [The Department] should not shun its role in support of the nation's professional skill and research base. Middle-size firms are not participating in the resurgent university-industry cooperation to the extent large and small firms [through small-business "set asides"] do.

Where the universities have the resources to permit collaboration as equals with companies, and the companies share the academics' interests, the relationship seems to thrive. But with today's pattern of funding, this tends to restrict the activity toward those companies with large corporate research laboratories, specifically designed to take advantage of university research.

Thousands of intermediate-size firms that do not pursue scientific research are nevertheless engaged in product and process innovation. They are determined to use the latest technology to be competitive. They should be able to benefit from collaboration with their local university, especially its school of engineering. But those schools of engineering are focused on preparing engineers for careers in R&D, not in design for manufacturing, manufacturing systems engineering, quality assurance engineering and other areas vital to industrial success and to a modern engineering education.

Thus, a properly focused Stevenson-Wydler program [a reference to 1980 legislation designed to promote industrial innovation through the Department of Commerce, but never implemented], focusing on academic engineering, could benefit thousands of firms that are poorly served by today's academic enterprise.

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